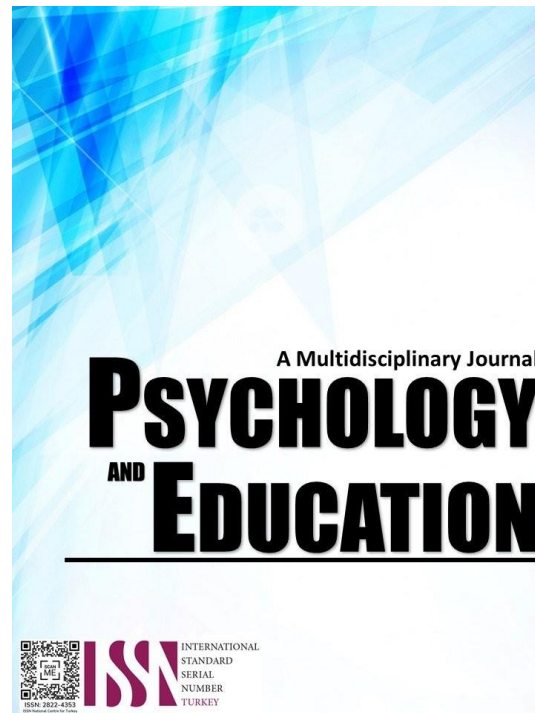


GUIDED SYMBOLAB APPLICATION (GSA): INTERVENTION STRATEGY IN ADDRESSING THE LOW-PERFORMING BSED MATH STUDENTS IN THE LET ENHANCEMENT ASSESSMENT



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Guided Symbolab Application (GSA): Intervention Strategy in Addressing the Low-Performing BSED Math Students in the LET Enhancement Assessment

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Abstract

This study was directed to help students who fall short of the 75% passing mark in the LET Enhancement Assessment of BSED Math from 1st-3rd years using the Guided Symbolab Application (GSA) which involved the guided usage of Symbolab as a tool in mentoring the participants about their least learned competencies. The study made use of the explanatory-sequential research design. The study revealed that the intervention was successful in improving the assessment performance of the participants. The P-value of 0.0001 (p-value < 0.001) indicated a very highly significant difference between the Pre-test and Post-test scores, supported by the qualitative data stating that the intervention provided a step-by-step process, acted as a means of checking answers, and guided the participants into using the app. Furthermore, the ME value of 0.835 indicated that the GSA intervention produced a large effect on the assessment performance of the participants, supported by qualitative notions that the GSA intervention enhanced the participants' problem-solving skills. The results implied a very highly significant difference between the Pre-test and Post-test scores of the participants. Moreover, the GSA intervention had a large effect on the low performance of the participants in the LET Enhancement Assessment.

Keywords: *guided symbolab application, least learned competencies, assessment performance, mentoring*

Introduction

Mapansin ko may iba parin talaga na hindi marunong mag graph; sa problem-solving pud nila, wala kabalo sa correct procedure." these are the statements of some NDMC Mathematics professors when asked about the recent performances of Math major college students. As per Sa'ad et al. (2014), in Nigeria, despite the significant weight attached to Mathematics by all stakeholders in education, the Mathematics examination results of public senior high school students yielded a poor performance among the examiners.

Leongson (2003), as cited in Andaya (2014), revealed that although Filipino students excel in knowledge acquisition, they fall considerably low in lessons requiring higher-order thinking skills. This unflattering situation is reflected in student performance in national and international surveys of Mathematics and Science competencies. Dimasindel (2017) conducted a research study on Mathematics Pre-service Teachers in Cotabato City, analyzing their performance and problem-solving skills. Despite having a solid foundation in mathematical operations and basic analysis, they are having difficulty understanding the topic since they failed to clearly characterize the challenges posed. As concerning as it already is, this problem was heightened during the emergence of the COVID-19 lockdown. In a conducted research by Obina et al. (2022), it was shown that the performance of Math major College students in NDMC has declined. This is due to their teachers' lack of engagement due to years of online classes. For these reasons, the learners opted to use Math applications to aid with their struggle. However, students have become dependent on these apps which resulted in having no challenge tolerance in doing tasks and having weakened critical thinking skills. Due to lacking face-to-face interactions with teachers, the utilization of these apps was limitless and unguided hence, could not always provide accurate answers and can cause confusion.

The situation is undeniably concerning because it shows how these students are lacking in their Mathematics skills, considering that it is a required course proficiency. Some distinguished NDMC Mathematics professors affirmed this by giving comments like how today's batches are unfavorably different from the past batches by having slow processing, comprehension, and retention with almost all of the given problems. These comments are backed-up with evaluation results which showed low performance. Specifically, on the first portion of the LET Enhancement Assessment recently conducted on all Math major college students, 10 out of 42 students did not reach the 75% passing mark. Although small, the necessity for an intervention is still crucial to address the issue.

The learners' low performance on the LET Enhancement Assessment can be attributed to many causes: an after-effect of the lack of student-teacher interaction during the pandemic, dependency on Math applications, laziness and tiredness, lack of enough comprehension when solving problems, and lack of focus. Based on Obina et al. (2022) in their recent survey on BSED Mathematics majors, it was ascertained that during the online learning modality, students have experienced difficulty in understanding the topic, and difficulty seeking help. Furthermore, they agreed on using Math apps to aid in solving Math problems, resulting in having no challenge tolerance in doing tasks, being doubtful about relying on their stock knowledge, and even weakening their critical thinking skills. Yet, despite their heavy reliance on Math applications, it was found that students are still doubtful of the results or answers that the apps provide.

Presuming that this issue persists, it can have concerning effects on the performance of the Math major students. For one thing, it can have negative effects on how they will be delivering their lessons as future educators. Having problems regarding their critical thinking and comprehension is concerning, especially since Mathematics teaching endorses the use of an inductive approach. Therefore, one cannot help students understand a Mathematical concept if one is not aware of how to explain it correctly. Moreover, their dependency on Math apps produces less logic and increases errors in their answers. One of the greatest reasons for this is the unsupervised use of these apps.

In reality, no matter how hard we try, we cannot simply overlook the presence of these apps and expect students to ignore them when told. Thus, perhaps the most effective way to deal with it is to incorporate it into their learning, as long as it is guided by someone more knowledgeable. This will allow students to focus more on the process of solving a problem, and elicit more interest in the students to learn since they are inclined to technology. As a solution, this research implemented a guided use of a smart Math solver application called Symbolab. With supervision, learners will be able to navigate the app correctly and utilize it inside the classroom without entirely relying on it. This research assumed that the intervention is an avenue to solve the existing problem.

Research Questions

This study was directed to help students who fall short of the 75% passing mark in the LET Enhancement Assessment of BSED Math majors from 1st year to 3rd year using the Guided Symbolab Application (GSA). This study specifically sought to address the following questions:

1. What is the assessment performance of the participants in the LET Enhancement Assessment before and after the Guided Symbolab Application (GSA) intervention?
2. What are the least learned competencies as grounded on the result of the assessment?
3. Is there a significant difference between the assessment performance of the participants before and after the GSA intervention?
4. What is/are the effects of the GSA utilization on the low performance of the participants in the LET Enhancement Assessment?
5. How does the GSA intervention help the low performance of the participants in the assessment?
6. What is the joint display between the quantitative and qualitative data?

Methodology

The explanatory-sequential method was employed in this study. This design starts with quantitative data collection and analysis which is then followed with qualitative and quantitative data collection and analysis.

Participants

The participants in this study were the 10 students who fall short of the 75% passing score under BSED Mathematics on the LET Enhancement Assessment and are officially enrolled in the school year 2022-2023.

Instruments

Pre-test. A standardized, multiple-choice test questionnaire that measures the assessment performance of the participants on the LET Enhancement Assessment before the intervention. The questionnaire was prepared by a Mathematics teacher.

Post-test. A standardized, multiple-choice test questionnaire that measures the assessment performance of the participants after the intervention. The questionnaire was formulated by the researchers with strict and careful guidance from the Math teacher who created the pre-test questionnaire.

Procedure

This study utilized the Guided Symbolab Application (GSA) method to improve the assessment performance of the experimental group. The data gathering had three stages: Stage I is the Pre-Intervention Stage where the Test Questionnaire is formulated starting with identifying the Math topics that are incorporated in the test. This stage as well included the LET Enhancement Assessment, the checking and scoring of the test papers, identifying the number of students who did not reach the 75% passing mark, and informing the participants and asking for their consent to participate in the research intervention. Stage II is the Intervention Stage where the experimental group was exposed to a mentoring class using the GSA method. Lastly, Stage III or the Post-Intervention Stage is where the post-test was conducted and the scoring of the test papers, as well as the measurement of the difference between the Pre-test and Post-test scores and the conducting of the interview.

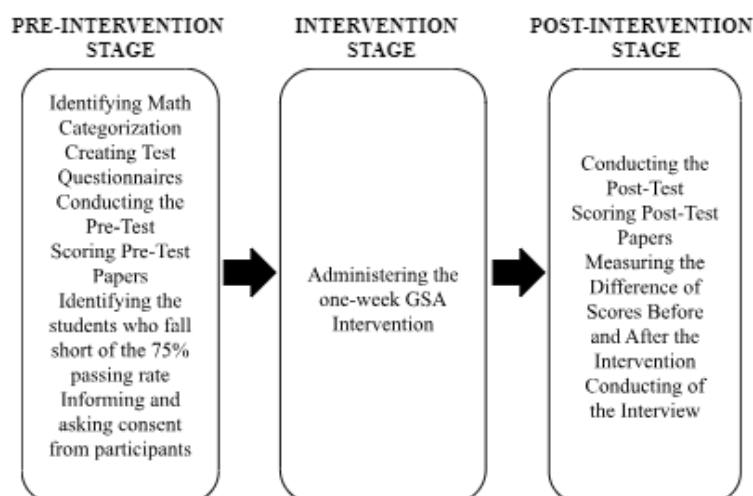


Figure 2. Schematic Diagram showing the Pre-Intervention, Intervention, and Post-Intervention Stage

Results

This section focuses on the analysis and interpretation of the data gathered from the participants. The data was gathered using quantitative pre-test and post-test methods, as well as using qualitative method through an interview.

Assessment Performance of the Participants Before and After the Guided Symbolab Application (GSA)

Table 1 presents the assessment performance of the participants during the Pre-test and Post-test.

Table 1. Assessment Performance of the Participants Before and After the Intervention

Variables	<i>n</i>	<i>SD</i>	<i>Mean</i>
Pre-test	10	1.81	5.80
Post-test	10	3.20	20.00

Table 1 shows the assessment performance of the participants during the Pre-test and Post-test. The standard deviation of the scores in the Pre-test is 1.81 with a mean score of 5.80 out of 25 least learned items of the participants in the assessment. Meanwhile, the standard deviation of the scores in the Post-test is 3.20 with a mean score of 20.00 out of 25 items containing the least learned competencies of the participants. The result implies that there is an improvement in the assessment performance of the participants which deemed the treatment highly effective.

The Least Learned Competencies Grounded on the Result of the Assessment

Table 2a displays the item analysis of the Pre-test using the scores of all students who took the LET Enhancement Assessment. These data distinguish the most learned competencies from the least learned competencies.

Table 2.1 Item Analysis

Item No.	Number of Responses		Percentage of Correct Responses	Implication
	Correct	Mistakes		
1	40	2	95	MLC
2	22	20	52	Average
3	27	15	64	Average
4	19	23	45	LLC
5	20	22	48	LLC
6	16	26	38	LLC
7	42	0	100	MLC
8	20	22	48	LLC
9	37	5	88	MLC
10	26	16	62	Average
11	30	12	71	Average
12	30	12	71	Average
13	37	5	88	MLC
14	22	20	52	Average

15	26	16	62	Average
16	30	12	71	Average
17	26	16	62	Average
18	8	34	19	LLC
19	42	0	100	MLC
20	26	16	62	Average
21	35	7	83	MLC
22	10	32	24	LLC
23	16	26	38	LLC
24	34	8	81	MLC
25	15	27	36	LLC
26	27	15	64	Average
27	38	4	90	MLC
28	15	27	36	LLC
29	19	23	45	LLC
30	6	36	14	LLC
31	14	28	33	LLC
32	8	34	19	LLC
33	21	21	50	Average
34	39	3	93	MLC
35	41	1	98	MLC
36	20	22	48	LLC
37	22	20	52	Average
38	8	34	19	LLC
39	35	7	83	MLC
40	31	11	74	Average
41	34	8	81	MLC
42	7	35	17	LLC
43	12	30	29	LLC
44	35	7	83	MLC
45	10	32	24	LLC
46	38	4	90	MLC
47	29	13	69	Average
48	14	28	33	LLC
49	23	19	55	Average
50	11	31	26	LLC
Total	1215	885	57.78	

75%-100% --- Most Learned Competency (MLC) 50%-74% ---- Average 49% below -- Least Learned Competency (LLC)

Table 2a presents the item analysis of the LET Enhancement Assessment test questions. These data are collected from the 42 BSED Math students who took the test. The item analysis revealed a total of 20 least learned items in the LET Enhancement Assessment which have a 49-below percentage of correct answers. These are items no. 4, 5, 6, 8, 18, 22, 23, 25, 28, 29, 30, 31, 32, 36, 38, 42, 43, 45, 49, and 50.

Table 2b displays the least learned competencies grounded on the results of the Pre-test.

Table 2.2 Least Learned Competencies

Item No.	Competencies The Learners	Implications
4	Uses definitions and theorems in proving propositions on divisibility.	LLC
5	Performs the four fundamental operations on exponential expressions.	LLC
6	Proves theorems concerning the prime numbers, greatest common divisor and least common multiple of integers.	LLC
8 & 30	Solves problems involving areas and volumes of basic geometric polygons.	LLC
18	Produces alternative solutions and make connections among concepts.	LLC
22 & 38	Performs the fundamental operations on algebraic fractions.	LLC
23	Defines sequence and series.	LLC
25	Summarizes data using measures of central tendency.	LLC
28	Applies appropriate properties in solving problems involving sums and products.	LLC
29	Applies principles of mathematical induction in proving formulae and other claims related to the integers.	LLC
31, 36, & 42	Collects and record data systematically and use logic in solving a problem.	LLC
32	Uses the fundamental identities in finding the trigonometric function values given one value and the quadrant.	LLC
43 & 45	Identifies and to factor polynomials with common factors with special products (difference of two squares, perfect square trinomial, sum and difference of two cubes) of the general quadratic trinomial form by adding and	LLC

48	subtracting the same expression.	LLC
50	Solves areas of a circle and/or polygons having relations with a circle or a sphere.	LLC
	Identifies and sketch graphs in space of lines, planes, cylindrical surfaces, surfaces of revolution, and quadric surfaces.	LLC

Table 2.2 presents the least learned competencies from the LET Enhancement Assessment. Out of the 20 least learned items, 15 least learned competencies were identified. These competencies are based on the competencies provided by the Commission on Higher Education (CHED). The least learned competencies are as follows: (1) Uses definitions and theorems in proving propositions on divisibility, (2) Performs the four fundamental operations on exponential expressions, (3) Proves theorems concerning the prime numbers, greatest common divisor and least common multiple of integers, (4) Solves problems involving areas and volumes of basic geometric polygons, (5) Produces alternative solutions and make connections among concepts, (6) Performs the fundamental operations on algebraic fractions, (7) Defines sequence and series, (8) Summarizes data using measures of central tendency, (9) Applies appropriate properties in solving problems involving sums and products, (10) Applies principles of mathematical induction in proving formulae and other claims related to the integers, (11) Collects and record data systematically and use logic in solving a problem, (12) Uses the fundamental identities in finding the trigonometric function values given one value and the quadrant, (13) Identifies and to factor polynomials with common factors with special products (difference of two squares, perfect square trinomial, sum and difference of two cubes) of the general quadratic trinomial form by adding and subtracting the same expression, (14) Solves areas of a circle and/or polygons having relations with a circle or a sphere, and (15) Identifies and sketch graphs in space of lines, planes, cylindrical surfaces, surfaces of revolution, and quadric surfaces. The result indicates that five of the total least learned items are under the subject of College and Advanced Algebra. Four items are under Number theory as well as under Problem-solving, Mathematics Investigation, and Modeling. Three items are under the course Plane and Solid Geometry. Moreover, there are two items under Calculus and one item under Trigonometry and Elementary Statistics and Probability.

Difference between the Assessment Performance of the Participants before and after the Intervention

Table 3 presents the data on the assessment performance of the participants during the Pre-test and Post-test. These data express significant differences before and after the intervention.

Table 3. *Difference between the Assessment Performance of the Participants Before and After*

Variables	n	SD	Mean	Mean Difference	P-value	Description
Pre-test	10	1.81	5.80	14.20	0.0001	Very Highly Significant Difference
Post-test	10	3.20	20.00			

$P = 0.05$ – Not Significant $P < 0.05$ – Significant $P < 0.01$ – Highly Significant $P < 0.001$ – Very Highly Significant

Table 3 shows the significant difference between the assessment performances of the participants during the Pre-test and Post-test. This is determined by the P-value and the mean difference. Since the P-value is 0.0001 ($p\text{-value} < 0.001$), this suggests that there is a very highly significant difference between the Pre-test and Post-test scores. The mean difference of 14.20 suggests that there is a large difference between the Pre-test and the Post-test test scores. The intervention resulted in a statistically significant improvement in the outcome measure from pre-test to post-test. Specifically, the mean score increased from 5.80 at pre-test to 20.00 at post-test, indicating a mean difference of 14.20 (CI = 95%, $P < 0.05$). The paired t-test revealed a very highly significant difference between the pre-test and post-test scores ($p\text{-value} = 0.0001$, $df = 9$, $p < 0.05$), indicating that the intervention had a significant effect on the outcome measure.

The Effects of the GSA Utilization on the Low Performance of the Participants in the LET Enhancement Assessment

Table 4 shows the effectiveness of the GSA intervention in dealing with the low performance of the participants.

Table 4. *Effect of the GSA Utilization on the Low Performance of the Participants*

Variable	SD	Mean	t-value	ME	Description
Guided Symbolab Application	3.20	20.00	-12.22	0.835	Large Effect

The Measure of Effectiveness (ME) 0.01 -1.05 ----- Small Effect 0.06 - 0.13 ----- Moderate Effect 0.14 above ----- Large Effect

Table 4 displays the effect size of the intervention on the low performance of the participants in the LET Enhancement Assessment indicated by the measure of effectiveness (ME). A significant difference was found between the pre-test and post-test scores. The resulting value of 0.835 revealed a large effect size, suggesting that the means are significantly different from one another and that the intervention or treatment has a meaningful impact on the outcome measure. This implies that the Guided Symbolab Application has a large effect in improving the assessment performance of the participants. These results suggest that the intervention may be a promising approach for improving the outcome measure and should be further investigated in larger studies.

The Aid of the Intervention to the Participants with Low Performance in the Assessment

Table 5 shows the themes of the ideas expressed by the interviewees in response to the questions given by the interviewer.

Table 5. *Thematic Map*

Interviewee	Significant Statement/s	Emergent Themes	Major Themes
1	The utilization of the Symbolab application helped me understand the problem since it provides a step-by-step process on how to get the answer as well as its explanation. It's easy to use if you know how to manipulate it. I want to use it on solving problems that I cannot understand.	- helps understand the problem - provides a step-by-step process - provides explanation - easy to use	- Provides a step-by-step process - Easy to use
2	The task after mentoring is okay since it helped us realize that the problems given are not that difficult as long as you had a review or discussion before answering. In Symbolab, you'll just simply encode or input [the problem], then it will provide the answer. I first solve the problem and then applied what you discussed which was very helpful. After that, I review my answer through the use of Symbolab. It shows the step-by-step solution to a problem and symbols (positive and negative) are easier to find than other Math applications. As a future teacher, maybe I could share it with my future students in order for them to be guided and also for them to review what the correct answer is. Then, it would also help them to solve in an easier way while putting an emphasis not to depend on Symbolab, but to correct the wrong [solution]	- easy to use - review answers through Symbolab after answering - step-by-step solution - Symbols (positive and negative) are easier to find - share it with future students as a guide and reviewer - not to depend on Symbolab - recalls the process of solving a certain problem	- Easy to use - Means of Checking - Provides a step-by-step process - Guided usage of Symbolab
3	Last time when we had our mentoring using Symbolab, I have recalled the process of how to get the correct answer to a certain problem. Moreover, I understood those problems that were not properly taught when I was in high school. Because of Symbolab, I can recall and understand the lesson more. However, there are still disadvantages when you frequently use applications, especially Symbolab. If you often use the application until you are in your 4th year, you will get used to using it. You will depend more on the application, therefore, you cannot learn. Once you start teaching, it will be inappropriate to use Symbolab alone in teaching your students.	- understood those problems that were not properly taught - helps understand the lesson more - using Symbolab often will make you dependent on it, then you cannot learn. - Using Symbolab alone in teaching will be inappropriate - a big help in the new normal mode of learning	- Understanding the lesson - Guided usage of Symbolab
4	Symbolab can be a big help to me especially in this new normal mode of learning. Also, Symbolab can enhance my solving skill in Mathematics problems. It allows me to practice and learn.	- enhance my solving skill in Mathematics - it allows me to practice and learn	- Enhancing Problem-Solving Skills

Table 5 displays the thematic map of the response of the participants during the interview. These responses answer the question of how the GSA helped them improve their performance in the assessment. With the responses, 6 major themes are derived. These are the following: (1) Provides a Step-by-Step Process, (2) Easy to Use, (3) Means of Checking, (4) Understanding the lesson, (5) Guided Usage of Symbolab, and (6) Enhancing Problem-Solving Skills. These major themes depict the help of the intervention to the low performance of the participants.

Joint Display of Quantitative and Qualitative Data

Table 6 presents the joint display of quantitative and qualitative data. These data show how the qualitative data supports the quantitative data.

Table 6. *The Joint Display of Quantitative and Qualitative Data*

Quantitative Display	Qualitative Display	Joint Display	Implication
The P-value of 0.0001 implies a very highly significant difference	Enhancing Problem-Solving Skills	Same Idea	The Guided Symbolab Application increased the assessment performance of the participants.



	Understanding the Lesson	Same Idea	
	Guided Usage of Symbolab	Same Idea	
The ME value of 0.835 implies that the Guided Symbolab Application (GSA) has a large effect	Provides a Step-By-Step Process	Parallel Meaning	The Guided Symbolab Application is very effective to the increase of the assessment performance of the participants.
	Means of Checking	Parallel Meaning	
	Easy to Use	Parallel Meaning	

Table 6 shows the joint display of the quantitative and qualitative data. The P-value of 0.0001 (p-value < 0.001) suggests that there is a very highly significant difference between the Pre-test and Post-test scores. This quantitative data is substantiated by qualitative data indicating that the GSA intervention provides a step-by-step process, acts as a means of checking answers, and guides the participants into using the app hence, making it easy to use.

Furthermore, the ME value of 0.970 indicates that the GSA intervention produced a large effect on the assessment performance of the participants. This is supported by qualitative notions which state that the GSA intervention made the Symbolab easy to use, and enhance the participants’ problem-solving skills.

Discussion

The participants' assessment performance before and after the Guided Symbolab Application (GSA) intervention differs significantly. Table 1 reveals that the mean Pre-test score of the participants was low, indicating a high level of difficulty with which carrying out an intervention was needed. This resulted in high mean Post-test scores, indicating that the GSA strategy aided participants in enhancing their assessment performance. This is parallel to the findings of Makhdum et al. (2023) which showed a great difference in the mean scores on the Pre-test and Post-test scores in which he implicated that the learners taught and guided using Symbolab scored more than the students taught without Symbolab Calculator.

Based on the rulings of the Pre-test or the Let Enhancement Assessment, there were 15 least learned competencies in which the students scored low. It included competencies in Number Theory, College and Advanced Algebra, Plane and Solid Geometry, Problem Solving, Mathematics Investigations and Modeling, Calculus II and III, Elementary Statistics and Probability, and Trigonometry. This is supported by the study of Jupri et al. (2015) which states that initial Algebra difficulties include applying arithmetic operations, comprehending the concept of variables and algebraic expressions, comprehending the different interpretations of the equal sign, and Mathematization. According to Rohimah (2019), some learners have trouble comprehending trigonometry since they are unable to comprehend trigonometric ideas. Students consider similarity and proof of trigonometric identity to be difficult Trigonometric material because it requires an understanding of the correct concepts and high accuracy in their application.

On the interpretation of data, Table 3 clearly shows a very highly significant difference in the mean scores of the participants before and after the intervention. This suggests that the supervised utilization of Symbolab in learning had a positive influence on the improvement of the participants’ assessment performance. This supports the study of Makhdum et al. (2023) which states that teaching simultaneous equations using a Math application was a more effective method in contrast to the traditional way of teaching Mathematics. The findings of the study revealed that learners who were taught simultaneous equations using the integration of Symbolab scored much higher on an MCQ-based accomplishment test than those who used the chalkboard or lecture technique. Therefore, this implies that there is a significant difference between the performance of the participants before and after the intervention. Yet, let it be known that these results are exclusive to the Mathematics major participants. Despite the short intervention span, a large effect was produced by the treatment due to the natural inclination of the participants to Mathematics hence, even a small aid would improve their assessment performance. However, this treatment might not render the same results to average, non-Mathematics inclined learners which would be a meaningful investigation to pursue.

Moreover, Table 4 displays that the GSA strategy has a large effect on the assessment performance of the participants in the LET Enhancement Assessment. This implies that the intervention greatly affected the participants by improving their low performance during the Pre-test. This is in line with the findings of Zhang et al. (2015), who found that using math apps improved student learning and reduced the achievement gap between struggling and typical students. This implies that the GSA intervention had a significant influence on the participants' poor performance in the LET Enhancement Assessment. Specifically, upon analyzing the post-test scores of the participants, it was revealed that most of the least learned competencies were overcome. The percentage of correct responses was 75% and above, and therefore deemed as MLC, at the following competencies: (1) Applies appropriate properties in solving problems involving sums and products, (2) Applies principles of mathematical induction in proving formulae and other claims related to the integers, (3) Performs the fundamental operations on algebraic fractions, (4) Collects and record data systematically and use logic in solving a problem, and (5) Identifies and to factor polynomials with common factors with special products (difference of two squares, perfect square trinomial, sum and difference of two cubes) of the general quadratic trinomial form by adding and subtracting the same expression. Excluding the MLC and the rest of the unmentioned competencies which are implied as average, one of the

competencies remained least learned. It is a competency that required learners to “Produce alternative solutions and make connections among concepts.” Nevertheless, all of the participants still got a passing score on the post-test. This may be attributed to the unsuitability of the intervention to teach that specific competency, or the capability of the participants to grasp Mathematical concepts which should be further investigated and studied.

Interpretation of Qualitative Data

The six (6) major themes exhibited in Table 5 represent the effects and support that the GSA intervention had on the low performance of the participants. These include (1) Provides a Step-by-Step Process, (2) Easy to Use, (3) Means of Checking, (4) Understanding the lesson, (5) Guided Usage of Symbolab, and (6) Enhancing Problem-Solving Skills which will be discussed separately.

Provides a Step-By-Step Process

The GSA intervention was deemed helpful to the participants because it helped them understand the problem, provided a step-by-step process, and provided an explanation. This is specifically evident during the mentoring session where through the guided use of Symbolab, the mentors were able to explain the context of the problem and explain the derivation of the correct answer aided by the step-by-step process provided by Symbolab. One interviewee even provided specific examples like how symbols (positive and negative) are easier to find when dealing with algebra problems. This complements the study of Kojo (2018) which states that the ability of the students to derive a correct step-by-step solution to a worded problem is directly proportional to the level of guidance a teacher provides.

Easy to Use

One feature of the Symbolab is that it is easy to manipulate, especially once the user is familiar with how it works. This is present in the mentoring session wherein the mentors not only explained the problem but the general manipulation of the application as well. Moreover, the participants are actually familiar with the application which creates a more interactive environment during the mentoring session since they are interested in how will the application be used. This agrees with the study of Matos et al. (2022) which states that the innovation and integration of Math applications in the classroom setting is effective because it is what students are gravitating towards.

Means of Checking

This is one of the functions the GSA strategy provided throughout the mentoring process; the mentors first input a problem in the app and then explain the step-by-step solution of it to the participants, the mentors then give a similar question to the one that was initially given and the participants will solve it without the app. After that, the mentors will then input the question into the Symbolab app to see if the participants' process coincides with what apps. According to one interviewee specifically, Symbolab helps in checking answers after solving. This supports the statement of Participant 1 in the study of Hadjinor et. al (2021) where they said that Math apps help by serving as a verifier of their own answers. However, Participant 2 said that students would rely on these applications which could discourage them to solve problems independently. These statements imply that even though Math apps help check whether the answer is correct or not, it is important to supervise the usage of these apps.

Understanding the Lesson

One reason why students don't get the correct answer is that they find it difficult to understand the problem and therefore, won't know how to manipulate the variables. This is one of the aids the GSA intervention has provided. Through the mentoring session, each of the least learned competencies was explained and interpreted to the participants in a way that they'll know how and what to solve once they encounter a similar problem again. This is evident in the response of the interviewees saying that it helped them understand the lesson more, specifically those topics that were not properly taught. This is corroborated by Zeidmane (2020), who noted that integrating Symbolab is considerably more useful for conceptually solving and understanding problems because students frequently do not comprehend what they have solved with homework in the traditional way. Moreover, the GSA strategy also helped in recalling the process of solving a certain problem.

Guided Usage of Symbolab

As stated in the initial chapters of this paper, the problem with using smart Math solver software is that learners become overly reliant on them, which causes issues such as a lack of challenge tolerance in doing tasks and weaker critical thinking skills, to name a few. The respondents saw these problems and said not to be too dependent on the apps because then you won't learn and will pose more problems in the future. This research solves that by integrating smart Math solver applications, Symbolab in particular, into the learning process as a guided tool in teaching the competencies. This way, not only the usage of the app is monitored, but it also endorses the correct way of using it by explaining the functions of the app and using it during the learning process and not during the assessment period. Furthermore, as future educators, the interviewees were also interested to use it as instructional material in the future as long as that there will not be too much dependency on it hence, the GSA tool. This supports a study by Lepp et al. (2014) carried out at Kent

State University, United States found out that students who utilize cell phones more frequently perform poorly academically than those who utilize them less. The extended use of mobile phones had a significant impact on students' study habits.

Enhancing Problem-Solving Skills

The GSA intervention did help the participants in enhancing their problem-solving skills by providing them with a guided lens for understanding and interpreting problems and solving them. In particular, the interviewees stated that it helped enhance solving skills in Mathematics for it allows them to practice and learn. This finding supports the statement of Kumar and Kumaresan (2008) that the effective utilization of Symbolab in Math classrooms has the potential to develop conceptual and geometrical understanding and a deeper approach to learning.

Joint Implications of the Quantitative and Qualitative Data

In accordance on the findings, the GSA intervention had a significant difference in the Pre-test and Post-test scores of the participants. This has the same idea as the qualitative notions which states that the GSA intervention enhanced their problem-solving skills, helped them in understanding the lesson, and guided the participants into using the app. Therefore, the GSA increased the assessment performance of the participants.

Moreover, the GSA intervention was effective in helping the participants understand the competencies they learned the least. This is parallel to the qualitative notions which states that the GSA intervention provided a step-by-step process for solving problems, served as a means of checking, and is easy to use. Therefore, the GSA is very effective to the increase of the assessment performance of the participants.

Conclusion

The findings lead to the following conclusions:

Ten (10) students enrolled in BSED-Math did not meet the 75% passing rate on the LET Enhancement Assessment. However, after using the Guided Symbolab Application as an intervention, their performance improved noticeably. It was discovered that there is a very highly significant difference in their performance prior to and after the intervention. Furthermore, the intervention adopted has a large impact on their performance.

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